U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

OpenEIS Project Overview

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Outline

- OpenEIS motivation, concept, and goals
- Relationship to commercial technologies
- OpenEIS Data Flow and Components
- Related efforts
- OpenEIS development process

OpenEIS Concept – DOE Vision

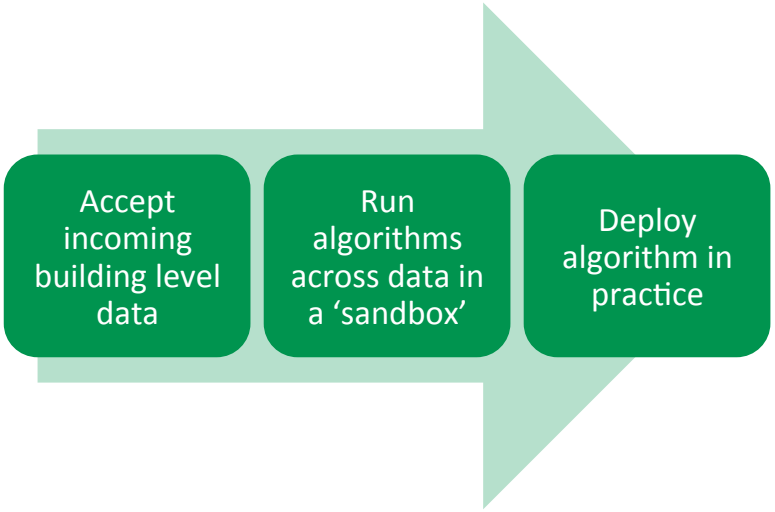
Advanced algorithms and analyses are adopted in limited cases, mostly by large enterprises with in-house expertise.

- 3 relevant barriers to more pervasive use of advanced algorithms include:
  - Lack of awareness that simple analytics can be used to generate valuable insights and actionable information, without further training
  - Risk averseness and perception of uniqueness - skepticism that analytics that are valuable in general case would work "for my building, occupants, systems"
  - Prohibitive first-costs to implement advanced approaches that in combination with points 1 and 2 above, have hindered market demand
- Laboratory-developed solutions stay in the lab and powerful solutions that are commercialized remain underutilized

OpenEIS Opportunity, Solution

Significant energy savings may be achieved by implementing advanced algorithms in buildings.

- Especially in small commercial buildings (<100K sq.ft.) where access to energy- and control- focused analytical approaches is particularly limited
- Solution: a tool that standardizes deployment, demonstrates benefits using building data in a sandbox before site implementation



OpenEIS Concept and Goals

OpenEIS is a tool that will address a gap in enabling deployment of high impact algorithms.

- A cloud-based open architecture software platform that can be used to upload and perform batch analysis of building energy and operational data
- Examples of analyses, algorithms, and controls in scope
  - Scheduling, control sequences and setpoints, energy waste, comfort
- OpenEIS will increase market demand, facilitate adoption
- FY 13 outcome: produce software requirements specification

Target Users for OpenEIS

OpenEIS is intended to enable owners and operators with the following characteristics to improve the energy and operational efficiency of their small commercial buildings:

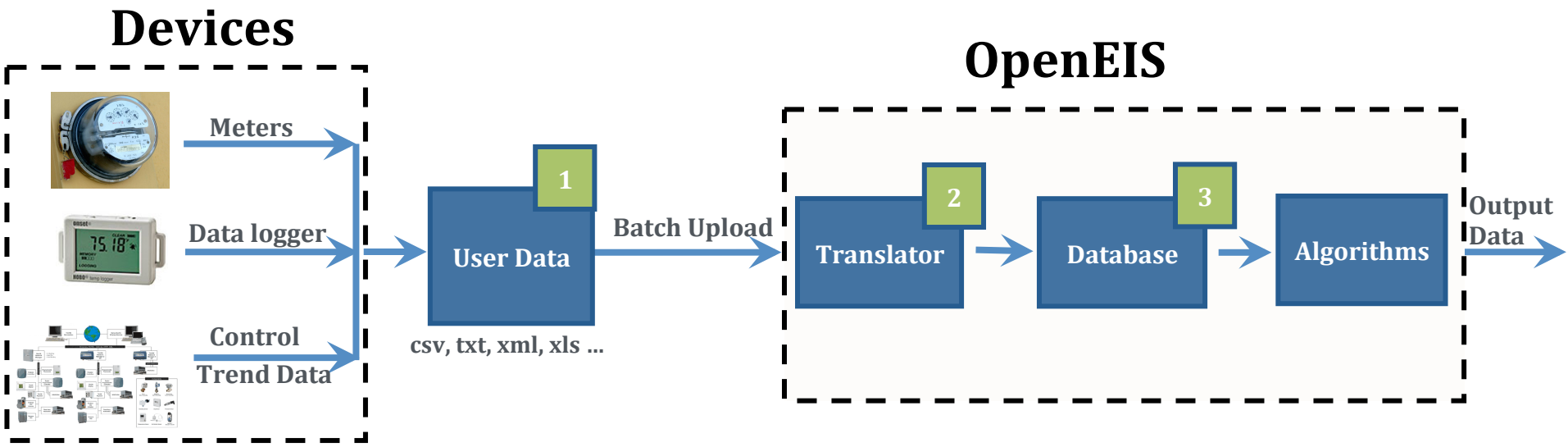
- Have access to building energy and operational data
- Play a role in facilities, energy, utilities, or operations management
- Impact changes in building controls and operations

Relationship to Commercial Technologies

OpenEIS is not intended to compete with existing commercial technologies.

- Intent is to create market pull and lower the transaction cost for new and existing service providers
- Provides low-risk opportunity to explore before implementing
- Targets smaller bldgs than can afford commercial solutions
- Once analyses are validated with users' data, they can either
  - 'drop' the 'apps' into their existing BAS/EIS
  - use results to justify budget for a new or enhanced control system or EIS

OpenEIS Data Flow and Components



Related Efforts

OpenEIS complements and extends related research and industry efforts.

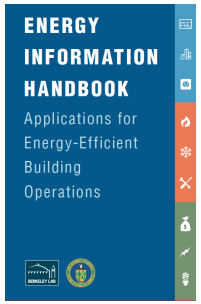
- Project Haystack, open-source development of standard data models, naming conventions, and taxonomies for building data
  - Supports cost-effective analysis and visualization of operational data, such as those OpenEIS seeks to deliver
- OpenSG, OpenADE, requirements for standardized interface to permit utilities to share customer data with specific 3rd parties
  - Supports green button and defines info exchange that OpenEIS could leverage

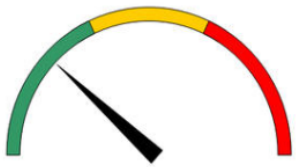
Project Haystack

OpenSG users group

Related Efforts (continued)

- ASHRAE RP 1633, interfaces and data for advanced building management and operation
  - ID most useful indicators, graphics, develop and test mock dashboards
  - Concepts could be leveraged in OpenEIS analyses and presentation
- 2012 DOE Energy Information Handbook, 18 analysis methods for operational efficiency
  - Instructional content those new to the use of building energy data
  - Some overlap in analyses offered by OpenEIS, static book, no automation





OpenEIS Development Process: History

Since the summer of 2012, DOE has confirmed the need for and initiated development of OpenEIS.

August 2012

- DOE conducted a situation analysis that confirmed need and opportunity to develop OpenEIS

November 2012

- DOE initiated funding to deliver a software requirement specification (SRS) for OpenEIS by October 2013
- DOE selected a team comprised of LBNL, PNNL, and Navigant personnel to support its efforts

February 2013

- DOE hosts the OpenEIS Workshop # 1– the first of two technical workshops to gather stakeholder feedback to inform the SRS development process

May 2013

- DOE hosts the OpenEIS Workshop #2

OpenEIS Development Process: Situation Analysis

Majority of stakeholders interviewed agreed that the DOE-developed OpenEIS would be useful because:

- OpenEIS addresses gap in value proposition of using commercial systems by illustrating benefits of use, which are currently difficult to quantify
- Development of OpenEIS-like system requires investment and resources, at a level challenging to commercial entities
- OpenEIS needs to come from a credible, objective third party so that users trust its results

OpenEIS Development Process: FY 2013 Plan

During fiscal year 2013, DOE will host two workshops and finalize a software requirement specification (SRS) for OpenEIS.

- DOE will use the workshop feedback to guide the SRS development